A circuit through the steel rings, the brass collar, the metallic rings on the rod, the projectile and the body of the gun was completed whenever the brass collar touched one of the rings on the rod. It was broken when the wooden portions passed, and so an alternate transmission and extinction of the polarised beam was brought about, which served the same purpose as in the arrangement first described. The curves obtained showed a constant acceleration of the projectile within the barrel, which would indicate a constant pressure of the gas. But unfortunately no complete records were obtained, the rods having broken off half-way through the barrel.

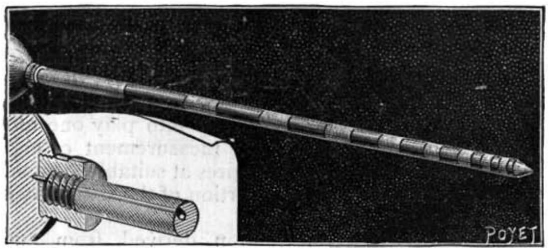


FIG. 2.—Apparatus for measuring velocity of projectile inside the barrel.

The most remarkable circumstance of all these trials lies in the extreme smallness of the intervals measured. In some experiments ten points were taken along a length of 72 cm., which corresponds to a duration of 0·005 seconds, and reduces the interval observed to 0·0005 seconds.

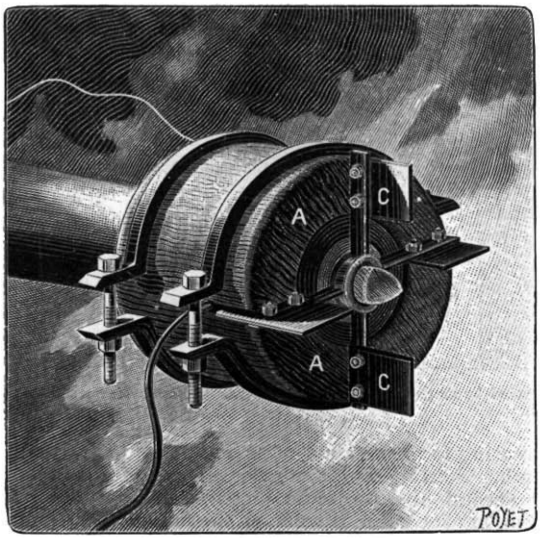


FIG. 3.—Block attached to muzzle for making circuit.

Needless to say, the apparatus may with equal success be applied to other fields of micro-chronographic investigation.

NOTES.

At the meeting of the Royal Society next Thursday, February 24, for the discussion of the scientific advantages of an Antarctic expedition, the following are likely to take part in the discussion which will be opened by Dr. John Murray:—The Duke of Argyll, Sir Clements Markham, Sir Joseph Hooker, Sir Archibald Geikie, Dr. Neumayer (Director of the Deutsche Seewarte), Dr. Sclater (Secretary of the Zoological Society), Prof. D'Arcy Thompson, and others.

PROF. ALEXANDER AGASSIZ writes to Prof. Ray Lankester from Sura, Fiji, under date January 3, as follows: "I got here first days in November, and found my steamer awaiting me; started the day after reaching Sura, and have been on the full run ever since. I have learned more about coral reefs than on all my former expeditions. Naturally my experience elsewhere has been of great service. The problem is getting more and more complicated. My boring was a fizzle. I only got to 80 feet; but in a region where there are elevated reefs nearly 1000 feet thick, that means nothing. From all I hear about the Funafuti boring (700 feet), and from what Prof. David writes, I fancy the bore-core will not bring us any nearer to a conclusion. It certainly can not help us to ascertain how atolls have been formed."

THAT until a few days ago (February 10) there lived in Eaton Square a nephew of Sir John Moore, and a man who many years ago attained a considerable distinction in geology, was little known to the present generation of scientific workers. John Carrick Moore was born in 1804, and inherited an estate in the northern part of The Rhinns of Wigtownshire, near Stranraer. He became a Fellow of the Geological Society in 1838, and two years later read a paper on the rocks which form the west shore of the bay of Loch Ryan, at the head of which Stranraer is situated. In subsequent years he devoted much attention to the fossiliferous Silurian strata of Wigtownshire and Ayrshire, and contributed the earliest account of the rocks near Carrick. He likewise published accounts of the Tertiary fossils of St. Domingo and Jamaica. For many years he served on the Council of the Geological Society, terminating his official connection in 1875. In 1846 he was appointed one of the Honorary Secretaries, and later on for several years he was a Vice-President of the same Society. He was elected a Fellow of the Royal Society in 1856. Educated at Queen's College, Cambridge, he early gained a sound knowledge of mathematics and physics, and in after years he contributed a few articles to the *Philosophical Magazine*, dealing with the influence of the obliquity of the ecliptic on climate, and criticising some of the principles enunciated by Ramsay with regard to the erosion of lake basins. Living to the advanced age of over ninety-four, Moore long outlived the majority of his old friends, of whom Murchison was one with whom he was intimately associated.

WE have received further correspondence relating to the two Societies in Lincolnshire, to which reference was made in our issues of December 30 and February 3. It appears that the older Society, the Lincolnshire Naturalists' Union, does not regard with unmixed friendliness the newer and possibly more vigorous Science Society. Into this unfortunate conflict of interests it is not our province to enter, and we can only repeat with renewed emphasis that it is a most serious mistake to allow the spirit of rivalry to enter into the matter at all. The welfare of both Societies can only suffer, and the progress of science in the county can only be retarded by friction. The Lincolnshire Science Society explains its origin by accusing the Union of failing to carry out the objects for which it was founded. There may or may not be truth in the accusation, but we are bound to admit that evidence of scientific activity on the part of the Union has not been obtainable. We cannot find the latter body among the corresponding societies of the British Association; neither can we learn that any publication has been issued under its auspices. Attention may be called to an article by Prof. Meldola, on the work of local societies, published in these columns in 1896 (vol. liv. p. 114), in which some of the causes of the decay of such societies are pointed out, and the advantages of federation insisted upon. We can only hope that Lincolnshire will not present to the scientific world a divided front on a question in which both parties are really striving for the same end.

IT is announced that in connection with the completion of his twenty-fifth year of office as Woodwardian Professor of Geology at Cambridge, Prof. T. M'Kenny Hughes, F.R.S., is to be the recipient of an illuminated address, to be presented at a public dinner to be held in London on Saturday, the 26th inst. Sir Archibald Geikie has consented to preside.

THE death is announced of Dr. Rudolf Leuckart, professor of zoology and zootomy at Leipzig.

PROF. ALEXANDER GRAHAM BELL has been elected president of the National Geographic Society, Washington.

MANY men of science will grieve to learn that there is no improvement in the condition of Sir Richard Quain, who has been in ill-health for some time, and is gradually getting weaker.

WE regret to see the report that Sir William Dawson, C.M.G., F.R.S., formerly principal and vice-chancellor of the M'Gill University, Montreal, has had a stroke of paralysis.

DR. NANSEN has consented to deliver a lecture at the Queen's Hall on the evening of Monday next, February 21. Lord Lister will take the chair.

The organisation of the Corps of Electrical Engineers, Royal Engineers (Volunteers), has now been completed, and applications for membership may be made to the adjutant, Captain Brady, R.E., at the headquarters of the Corps, 13 Victoria Street, S.W. Major J. Hopkinson, F.R S., is in command, and Lord Kelvin is honorary colonel. The War Office is offering every encouragement to the development of this new Corps of Volunteers.

IN the House of Commons on Monday, Sir H. Vincent asked the Under-Secretary of State for Foreign Affairs what grant would be proposed from public funds for the representation of the United Kingdom at the Paris Exhibition of 1900; and if he could state what sums Germany, the United States, and Italy proposed to allocate for the representation of their national industries. In reply Mr. Curzon said :—It is proposed to ask Parliament for a grant of 75,000*l.* to provide for the expenses connected with the British section. The German Government has sanctioned a grant-in-aid of 5 million marks, or about 250,000*l.* The United States Government has made a Treasury estimate of 350,000 dollars, or about 70,000*l.* In Italy nothing has yet been officially settled as to the exact amount to be devoted to this purpose.

A GREAT authority on iron and steel has passed away in the person of Prof. Styffe, who died in Stockholm on February 3, having just entered his seventy-fifth year. After completing his studies at the University of Upsala (says *Engineering*) he passed through the School of Mines at Falun, and was afterwards engaged as a mining engineer in the Sala silver mines, but he was soon called by his Government to be the chief director of the Royal Technical Institution at Stockholm. Here he rendered great services during more than a quarter of a century, and was consulted at the same time by the Board of Iron and Steel Works (Jernkontor) in Sweden. When the construction of railways was begun in Sweden, some forty years ago, the question naturally arose of using the excellent native iron and steel for the railway plant, and the State appointed a Committee to make careful researches as to its adaptability for the purpose. Director Styffe was appointed chief of this Committee, and carried out these researches during a period of five years in the most minute and scientific manner. His results were published in the *Annals* of the Jernkontor, or Board of Iron and Steel Works in Sweden. They were translated into English by C. P. Sandberg, and published under the title of "The Elasticity, Extensibility, and Tensile Strength of Iron and Steel." The work caused a great deal of interest in the engineering press at the time. Styffe was juror for Sweden for mining and metallurgy at the London International Exhibition in 1862, and at the subsequent exhibitions in Paris and Vienna. Last summer he was present as an honorary member of the International Congress for the Testing of Materials at Stockholm, and was duly honoured for his long and valuable services.

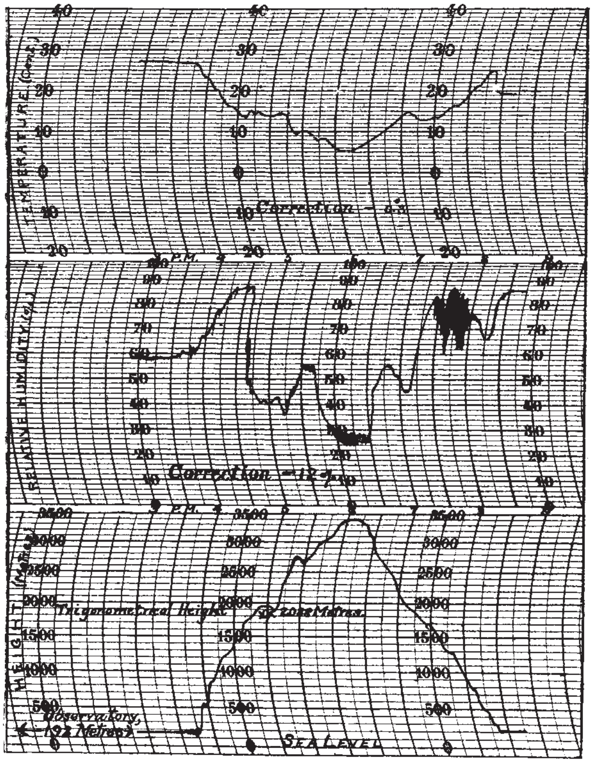
AMERICAN geographers appear to be far from pleased with the projected plans of Captain Sverdrup. He purposes this summer to use the *Fram*, with Dr. Nansen's approval, for the exploration of the northern shores of Greenland. These plans, it is objected, materially affect and invade Lieut. Peary's field of work, who has not only already done a great deal on the north coast of Greenland, but has for a long time had in view a project for its continued exploration this summer. The American Geographical Society, in its recently-issued quarterly *Bulletin*, publishes two strong protests. It is asserted that Captain Sverdrup, by setting out at the same time, adopting Peary's route and aims, utilising his experience, and interfering with his resources of men and dogs in North Greenland, will frustrate the labour of ten years, and turn to advantage all that skill and courage has already accomplished. The caustic comment is made: "There is no legal impediment in Captain Sverdrup's way. He can do these things if he will, and men will remember him as the one Arctic voyager whom they would gladly forget."

THE "Year-Book" of the Royal Society, No. 2, 1897–98, has just appeared. There are several features in it which lend additional interest, and form an improvement on the last issue. For instance, the scheme of regulations for the administration of the Publication Grant of 1000*l.* from H.M. Treasury is given, as well as a good deal of information regarding the annual Government Grant for scientific research, such as an account of the appropriations, and a list of the Boards recommending assignments from the fund. A note on p. 1 states that applications for grants, and the reports on them, must be sent in by January 31; but the late issue of this "Year-Book" (apparently it is brought down to November 30, in each year) renders the information valueless, at any rate for the current year. The President's address and other anniversary matter is now omitted from the *Proceedings*, and published instead in the "Year-Book."

A STRIKING novelty in vacuum tubes is described by Prof. Trowbridge and Mr. Burbank in the February number of the *Philosophical Magazine*. The space between anode and kathode is done away with, and a continuous wire is led through the exhausted tube, which is then inserted in a circuit containing a spark gap and one of Trowbridge's improved "rheostatic machines." The latter is charged by means of a battery of 10,000 storage cells. The condensers constituting the machine are charged in parallel, and then discharged in series, thus giving rise to a voltage which may be made to approach a million. It is not surprising that by this means novel results are obtained. The tubes glow all over with a brilliant phosphorescence. X-rays are developed; but their photographic effect cannot well be brought into evidence, owing to the fact that brush discharges pass between the tube and the sensitive plate, which on development has a star-spangled appearance. The skin of the hand shows all the symptoms of X-ray burning. An aluminium mirror attached to the wire inside the tube throws a beam of kathode rays upon the wall, which may be deflected by a piece of tinfoil. At extreme exhaustions no difference is noticeable whether the tube is on the anode or the kathode side of the spark gap. The distinction between anode and kathode rays disappears.

FROM the Blue Hill Meteorological Observatory, of which Mr. A. Lawrence Rotch is director, we have received a *Bulletin* (the first issued from the Observatory), by Mr. S. P. Fergusson, on the highest kite ascensions in 1897. On September 19, 1897, as already described in NATURE (vol. lvi. p. 540), the meteorograph was raised to a height of 3013 metres above sea-level. The highest kite was 40 metres above the meteorograph, or 3052 metres above sea-level. The kites and meteorograph were sent up from near the summit of the hill, which is 192 metres above sea-level. On October 15, 1897, the meteorograph was raised to a height of 3571 metres above sea-level, or 558 metres higher than on September 19. The highest kite was 40 metres above the instrument, or 3611 metres above sea-level. At the top of the line were a Lamson ribbed kite with curved surfaces, having an area of 6·60 square metres, and a self-adjusting Hargrave kite, having an area of 3·35 square metres. Two other Hargrave kites, each having an area of 2·13 square metres, were respectively attached at distances of 2000 and 3500 metres from the top of the line. The length of line employed was 6300 metres, and the pull, when all the line was in the air, varied between 56 and 68 kilograms. The instrument left the ground at 3.48 p.m., and reached the highest point at 6 p.m. The work of reeling in the line began at 6 p.m., and the instrument reached the ground again at 8.20 p.m. The meteorogram obtained during this flight is one of the best that has been secured, being complete, with very clear and smooth lines. It is here reproduced from the *Bulletin*. At the highest point reached the temperature was 5·0° C., and at the Observatory it was 22·2°. An interesting feature of this flight was the passing of the meteorograph through the cumulus and alto-cumulus levels of clouds, as shown by the increase followed by a decrease of humidity at heights of 1500 and 2800 metres. At the Observatory the wind was from the south-west during the entire flight, and the velocity varied between 5·4 and 8·0 metres per second, true velocity. Above the height of 1000 metres the direction of the wind was north-west.

KITE METEOROGRAM OF OCT. 15, 1397.



PROF. GEORGE M. STRATTON, of the University of California, has made a novel experiment in inverted vision by wearing for eight days a mask fitted with lenses which invert the visual image, thus projecting it upon the retina in an erect instead of the normal inverted position. He soon learned to refer all objects to their correct positions, in other words to see them right side up; but, on removing the apparatus at the expiration of eight days, everything appeared to be upside down at first. He therefore concludes that the seeing of objects right side up is due to a mental rectification of the visual image actually projected upon the retina.

AT the meeting of the New York Academy of Sciences on January 24, Mr. E. L. Thorndike, of Columbia University, gave an account of a long series of interesting experiments on comparative psychology. These experiments were made upon cats, chickens, dogs, monkeys and other animals, and were supplemented by the experience of professional animal trainers. According to a report in *Science*, cats were placed in boxes with doors so arranged that they could be opened from the inside in various ways, in one set of experiments by pressing a latch, in another by pulling a cord, by pulling a hook attached to a cord, or by turning a button. Again the arrangement was more complicated, and two or three separate movements had to be combined in order to release the door and let the animal out to reach the fish placed outside the cage. Curves were given showing the rate at which the kittens learned the various tricks, the time taken to get out becoming gradually shorter. The trick was always learned by accident; one lucky hit would prepare the way for another. There was no trace of rational inference. Seeing another animal do the trick a hundred times was no help. Nor was it possible to teach the trick by taking the kitten's paw and putting it on the latch, and so opening the door, no matter how often it was repeated. A habit once formed artificially will overpower natural instincts. A chicken that had been compelled to jump from a box to the floor in a roundabout way by a cardboard placed in its way, felt unable to jump down to its food directly when the card was taken away.

SIR A. HARDINGE'S report on the East Africa Protectorate, 1897 (c.-8683), contains a careful summary of the manners and habits of the native tribes. There are many broken or slave tribes, besides full tribes. One common characteristic appears to be the looseness of the tribal tie and the small amount of direct government, either by chief or council. The Wagiriama of the Malindi district are a vigorous and handsome race of a dark brown, almost black, colour; and closely allied to them, though politically distinct, are the Wakauma. They have a loose republican sort of organisation, based partly on tribal subdivisions and partly on a kind of freemasonry known as "kambi," which involves several degrees, each attended by its special ceremony of initiation. The Wapokomo of the Tana River district are a fairly handsome and intelligent Bantu race, dwelling in thick clusters of beehive-shaped straw huts all along both sides of the river. The Wakamba occupy the Attri district, and a very useful table is given of the internal subdivisions so far as they are known. Each family occupies its own "boma" or hamlet, and a man on marrying usually forms a boma of his own, consisting at first, perhaps, only of his own hut, but gradually expanding into a hamlet and thence into a village, of which its founder is regarded as the chief. Here is Sir Henry Maine's famous patriarchal family in the making; but we should much like to have further particulars and assurance that this description is justified by accurate scientific observation. The tribes of the interior have neither idols, priests, nor temples; but there is a vague general belief in spirits, mostly evil, dwelling in or near certain trees or sacred spots, in witchcraft and in ghosts, as well as a more vague belief in a kind of supreme being. The various tribes have each their sacred animal or totem, which it is unlawful for them to eat or kill. Altogether this is an excellent report, and the accompanying maps make it of some value to anthropological students.

AN exploration of considerable importance has lately been undertaken by the East Siberian branch of the Russian Geographical Society (*Izvestia*, xvii. 1, 2; xviii. 3). M. Sibiryakoff, a well-known owner of gold-mines, having put a large sum of money at the disposal of this society, about twelve persons, thoroughly acquainted with the Yakutsk province from a many years' stay in different remote parts of it as political exiles, were invited to join in a detailed exploration—anthropological, ethnographical, linguistic, and economical—of the Yakut and Tungus population of the province. The exploration, which has now been carried on for three years, has resulted in the accumulation of most valuable materials. Anthropological measurements and photographs of Yakuts, Tunguses, and Russians were made by MM. Gekker, Mainoff, and Vitashevskiy, on a very large scale, and part of the data has already been published in the *Memoirs* of the East Siberian branch. Special excursions to inquire into the economical conditions of the population were made; all materials which are kept in the archives of the local administration, and which could be utilised for historical, ethnographical or economical purposes, were consulted. The common law of the natives was carefully studied, as also their folk-lore and their traditions; and, finally, the exploration was extended by the exiles who are kept in Sredne-kolymsk to the extremely interesting, and almost quite unknown, Yukaghires of the Arctic littoral; while S. Kovalik has nearly prepared for print a complete history and ethnographical description of the Yakuts of the Olekma region. At the same time E. Pekarsky, who speaks in Yakut as in his mother tongue, has prepared for publication a most elaborate and highly appreciated Yakut dictionary. For compiling it, he has utilised all formerly printed materials, as also many MSS. which were kept in the library of the East Siberian branch, and a considerable amount of notes collected by his comrades within the last fifteen years. A special sum was subscribed by M. Sibiryakoff for the publication of this dictionary.

A NEW process for preventing the decay of wood has recently been introduced, and extensive works set up at Millwall for treating timber. The inventor, Mr. Samuel Edward Haskin, has been engaged for the last twenty years in experimenting and perfecting the process in America. Hitherto the method adopted for preventing wood from decay has been by the withdrawal of the sap, and the injection of creosote or other antiseptic substances. The Haskin process, on the contrary, retains the sap, but destroys its germinative principle. To procure this result the wood to be treated is placed in a cylindrical heating-chamber, and submitted to a medium of superheated air at a pressure fourteen times as great as the normal pressure of the air. The substances composing the sap are by this means chemically changed, and form a powerful antiseptic mixture, which becomes consolidated with the fibre, thus strengthening and preserving the wood.

MR. H. L. RUSSELL is continuing his experimental investigations on the ripening of cheese, and, in conjunction with Mr. S. M. Babcock, has recently published an important paper describing what the authors consider to be a new factor in this process. Hitherto these changes have been solely ascribed to the direct or indirect action of the bacteria that are present in the milk, and the lactic acid bacteria have been credited with playing the chief *rôle* in this matter. But Russell and Babcock have shown that profound changes of a physical and chemical nature occur in milk in which bacterial fermentations have been excluded, and by means of carefully carried out experiments they have obtained results which they consider justify the assumption that these changes are of a non-vital character, and due to the presence of ready-formed enzymes in the milk as obtained from the cow. They have, moreover, succeeded in separating out proteid-converting (proteolytic) enzymes which, when applied to milk, exerted a curdling as well as a digestive function. The authors believe that the ripening of hard cheese, instead of being due solely to bacteria, is caused by the joint action of both organised (bacteria) and unorganised ferments (enzymes). This is a novel suggestion, and will doubtless stimulate research in this direction. Meanwhile the characteristic flavours of cheeses still remains a problem, and it is probable that in this department investigations may teach us to credit bacteria with yet more importance than we are even at present inclined to ascribe to them. The authors' memoir is to be found in the fourteenth annual report of the Wisconsin Agricultural Experiment Station, issued in December last. Agricultural research in this country may well take a lesson from the splendid work which flows so continually from the recently equipped scientific stations in the United States; formerly the investigator had but little more than German journals to take into consideration, but now he has to refer on all sides to American publications.

THE *Bulletin* No. 2 (December 1897) of the Laboratories of Natural History of the State University of Iowa consists of two articles—"The Coleoptera of the Lower Rio Grande Valley," by Mr. H. F. Wickham, and "The Ferns of Nicaragua," by Mr. B. Shimek. In the latter paper the number of species enumerated, including Ophioglossaceæ and Marattiaceæ, is 198, belonging to 39 genera, justifying the author's description of Tropical America as the "fern-paradise of the earth." (In the British Islands we have 38 species belonging to 17 genera.) The larger number of these were collected by the author in a botanical expedition undertaken for the University. The high mountains in close proximity to the sea afford a climate remarkably well adapted for the growth of ferns, which are stated to form the most conspicuous feature of the vegetation excepting palms. A large number are epiphytic, and they vary in size from tiny species of *Trichomanes*, with fronds only a fraction of an inch in height, to clinging "vines" like *Blechnum volubile*, single fronds of which often exceed 30 feet in length, or to splendid tree-ferns. The paper is illustrated by twenty excellent plates.

Farmers' Bulletin, No. 68, of the U.S. Department of Agriculture is devoted to a description of the black rot of the cabbage, and the best remedies or preventives, by Mr. E. F. Smith. The disease is due to *Pseudomonas campestris*, a parasite especially destructive to plants belonging to the Cruciferæ.

MESSRS. SWAN SONNENSCHEIN AND CO. have in the press a work on "Epidemic Diphtheria," by Dr. Arthur Newsholme. The work embodies a research on the origin and spread of the disease, from an international standpoint.

MESSRS. CROSBY LOCKWOOD AND SON ask us to state that the forthcoming work on "Submarine Telegraphs: their History, Construction, and Working," by Mr. Charles Bright, will be published very shortly, and to remind our readers that the subscription price ceases to apply on the date of publication.

A THIRD and revised edition of Mr. W. Arnold Buffum's interesting book on amber, entitled "The Tears of the Heliades, or Amber as a Gem," has been published by Messrs. Sampson Low, Marston and Co., Ltd. The volume brings together many facts of interest concerning the origin and decorative uses of amber.

THE determination of the density of a gas has, till comparatively recently, been regarded as an operation of great difficulty, requiring elaborate apparatus and a large quantity of material. In the course of his researches on argon and helium, however, Prof. Ramsay has shown that it is possible by direct weighing to arrive at a reasonably accurate result upon as small a quantity as thirty cubic centimetres. In two recent numbers of the *Comptes rendus* are two contributions to this subject by M. Th. Schlœsing, jun., in which he gives a most ingenious method of measuring the density of a gas, based upon the balancing of two columns of the gases in a U-tube. Two vertical tubes about one metre in length communicate at their lower ends by a three-way tap; in one is placed an easily absorbable gas of known density, such as carbon dioxide, and in the other the gas under examination. On allowing the columns to communicate through the tap, a state of equilibrium between the gas, carbon dioxide, and air is set up after about four minutes, and the level of the invisible surfaces of separation then determined by absorbing the carbon dioxide with potash. In order to reduce the unavoidable diffusion of the gases, very narrow tubes were taken (1·6 mm. to 2·7 mm. in diameter), with the resulting advantage of reducing the quantity necessary for a determination. In the second paper data are given for nitrogen, oxygen, and methane, from which it would appear that an accuracy of 1/1000 is obtainable upon five to seven cubic centimetres of gas. With hydrogen only was there a failure, the mutual diffusion of the two gases being too rapid to allow of equilibrium being set up. There can be no doubt that the method will admit of many useful applications.

THE additions to the Zoological Society's Gardens during the past week include a Green Monkey (*Cercopithecus callitrichus*) from West Africa, presented by Mr. Robert O'Callaghan; a Horned Lizard (*Phrynosoma cornutum*) from California, presented by Mr. Charles Iseard; three Shaw's Gerbilles (*Gerbillus shawi*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

A PROBABLE NEW STAR.—In Circular No. 45 from the Wolsingham Observatory, dated February 14, the Rev. T. E. Espin states that an eighth-magnitude red star not in B.D. was found the previous night, its place being R.A. 7h. 12m. 16s., Decl. + 32° 19′ (1855).

NEW PHOTOGRAPHS OF NEBULÆ.—With a reflector having the extraordinary ratio of 1 metre aperture to 3 metres focal length, M. A. Rabourdin has taken some remarkable photographs of several nebulæ at the Meudon Observatory, and he gives a detailed account of them in *Comptes rendus* for January 31. On the ring nebula in Lyra he made three exposures—of twenty, thirty-five and fifty-five minutes. "These three plates," he remarks, "show that for this annular nebula the nebulosity of the interior increases with the time of exposure, whilst the total diameter increases very little. The final result is an elliptical nebula in place of the annular one taken with the short exposure. The photographs also show very plainly a star at the centre of the ring, which is, moreover, visible to the eye in the telescope; but neither the drawings of Herschel in 1833, Lord Rosse in 1844, nor that of Trouvelot in 1873, give any indication of it. Hence this would tend to show a comparatively recent change."

With an exposure of fifty minutes on the planetary nebula in Aquarius, a photograph was obtained showing two protuberances diametrically opposite, which would lead one to suppose that the central globe is surrounded by a diffuse belt analogous to Saturn's ring.

A photograph of the nebula in Andromeda, with only one hour exposure, is said to exhibit as much detail as those previously obtained with four times the exposure; and the nebula is so extensive, that it was quite impossible to photograph the whole region on one single plate.

A photograph of the nebula in Triangula shows that it is a beautiful spiral one.

The region of the Pleiades was also photographed, giving one hour exposure, with Alcyone in the centre of the plate. Even with this comparatively short exposure, MM. Henry have discovered nebulæ absolutely invisible in the telescope, enriching this region still more with two other new nebulæ surrounding Atlas and Pleione. This photograph also shows more than the beautiful chart of the Pleiades taken by MM. Henry, and exhibits additional streams of nebulous matter which apparently bind together certain stars of this group.

CARBON IN THE CHROMOSPHERE.—That carbon existed in the solar spectrum itself was at one time a matter of doubt, but its existence was established long ago by the early researches of Sir Norman Lockyer. Now, with the aid of the 40-inch telescope of the Yerkes Observatory, Prof. Hale has observed the presence of carbon in the chromosphere, and his paper on this subject is to be found in the December number of the *Astrophysical Journal*. The observations were made last September, and the green fluting near *b* was distinctly seen as a bright reversal in the chromosphere. M. Deslandres, who was visiting the observatory at the time, had no difficulty in seeing the lines, and they have since been observed by Profs. Runge and Keeler.

These results are interesting, in the light of the fact that the photographs of the total eclipse of 1896 show a decided influence of the prominences on the corona, and the examination of the corona itself at the last eclipse, for the presence of carbon might possibly have led to fruitful results.

PARALLAX OF SIRIUS.—In the *Monthly Notices* for January, Dr. Gill discusses a series of observations for the parallax of Sirius, made by him in 1888–89 with the Cape heliometer. The comparison stars used were both of 8·7 magnitude; one, which he denotes by γ, being 4310″ distant, and the other, δ, 4536″ away from Sirius, with respective position angles of 279°·17 and 101°·26.

From these observations he deduces a value of 0″·370 ± 0″·0097, which is in remarkably close agreement with his well-known result of 0″·370 ± 0″·009 from his 1881–83 observations.

Dr. Gill states that by this method of measurement it was possible to determine parallaxes so small as 1/50 of a second with some confidence—a degree of accuracy not previously attained in astronomical researches of any kind. He therefore thinks we may regard the parallax of Sirius as now satisfactorily determined, and that the corrections depending on a parallax of 0″·37 might with advantage be introduced in the apparent places of Sirius given in the national ephemerides.

WE note with pleasure that Mr. A. C. D. Crommelin, in the *Monthly Notices* for January, continues his paper which appeared in the December number, on the "Ephemeris for physical observations of Jupiter, 1898." We had been so long accustomed to seeing the late Dr. Marth's name attached to these and similar tables for the moon and other planets, that it was doubtful who would volunteer to fill his place; but we are glad to find that one so able as Mr. Crommelin has undertaken this task.

THE ATOMIC WEIGHTS OF NICKEL AND COBALT.

THE determination of the atomic weights of nickel and cobalt has attracted a considerable amount of attention during the last few years, the numbers obtained by different workers exhibiting relatively startling variations. Thus, including only the four most recent results, the values for cobalt vary between 58·78 (Hempel and Thiele, 1895) and 60·12 (Schützenberger, 1892). Similar variations observed for nickel by Krüss, led him to the conclusion that this metal contained a new element, to which he gave the name of "gnomium"; but recent work has not tended to confirm this view. In the *Proceedings* of the American Academy of Arts and Sciences for November and December last, are two important contributions to this subject, by Richards and Cushman and